

Online Supplementary Material

Associations between dietary scores with asthma symptoms and asthma control in adults

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Supplementary Methods

Diet scores assessment

We computed three dietary scores reflecting adherence to a healthy eating: the AHEI-2010, the MEDI-LITE, and the mPNNS-GS.

The AHEI-2010 includes 11 components: six components for which the highest intake was supposed to be ideal, one component for which moderate intake was supposed to be ideal, and four components for which avoidance or lowest intake was supposed to be ideal. Each component is given a minimal score of 0 and a maximal score of 10, with intermediate values scored proportionally, and all the component scores are summed to obtain a total AHEI-2010 score which ranges from 0 to 110. In our study, we computed a modified AHEI-2010 including all the items except for trans-fat (not available); therefore, the highest value was 100.

The MEDI-LITE score includes 9 components: six components for which the highest intake was supposed to be ideal, one component for which a moderate intake was supposed to be ideal, and two components for which avoidance or lowest intake was supposed to be ideal. Each component is given a minimal score of 0 and a maximal score of 2, and all the component scores are summed to obtain a total score which ranges from 0 to 18.

The PNNS-GS includes 13 components: eight components referred to food-serving recommendations, four referred to moderation in consumption, and one focused on the adherence to physical activity recommendations. Moreover, points are deducted for overconsumption of salt, added sugars or when energy intake exceeds the estimated energy needs by more than 5%¹. Scoring has been described in details elsewhere, and the final score ranges from (possible) negative scores to 15. In our study, we used a modified version

of the validated PNNS-GS without the physical activity components (mPNNS-GS). The mPNNS-GS ranges from (possible) negative scores to 13.5.

Supplementary Results

Participants who answered to the respiratory survey were compared to participants who did not answered (n=81,416). As expected, respondents were older, more often never smokers, had a higher educational level, were more physically active, and less likely to be obese (see Supplemental Table 1).

In addition to baseline characteristics of the participants according to the AHEI-2010 diet score (table 2, main text), baseline characteristics according to the MEDI-LITE diet score and to the mPNNS-GS diet score are presented in Supplemental Table 2 and 3 respectively.

Associations between tertiles of dietary scores and asthma symptom score among women and men without ever asthma are presented in Supplemental Table 4.

Associations between tertiles of dietary scores and asthma symptom score among women and men stratified according to smoking are presented in Supplemental Table 5.

Associations between tertiles of dietary scores and asthma symptom score among women and men stratified according to BMI are presented in Supplemental Table 6.

Characteristics of the 2,063 women and 546 men with asthma, according to asthma control are presented in Supplemental Table 7.

Supplementary table S1 Comparison of characteristics between respondents (n=40,152) and non respondents (n=81,416) to the respiratory survey, NutriNet-Santé cohort

	Respondents (n=40,152)	Non respondents (n=81,416)	P value*
Age at inclusion, mean (sd)	48.4 (14.0)	39.6 (14.0)	<0.0001
Sex, n (%)			
Women	30,139 (75.1)	64,197 (78.8)	<0.0001
Men	10,013 (24.9)	17,219 (21.2)	
Smoking, n (%)			<0.0001
Never smokers	20,460 (51.0)	38,381 (47.1)	
Ex-smokers	14,816 (36.9)	24,063 (29.6)	
Current smokers	4,869 (12.1)	18,657 (22.9)	
Missing	7 (0.02)	315 (0.4)	
Educational level, n (%)			<0.0001
≤ 13	120 (19.5)	812 (21.0)	
14	7,851 (15.2)	17,063 (19.7)	
15-16	6,090 (30.1)	16,055 (29.0)	
≥ 17	13,870 (34.5)	23,647 (29.3)	
Missing	272 (0.7)	812 (1.0)	
Leisure-time physical activity, n (%)			<0.0001
High	12,606 (31.4)	21,300 (26.2)	

Moderate	15,247 (38.0)	27,398 (33.7)	
Low	7,796 (19.4)	17,271 (21.1)	
Missing	4,503 (11.2)	15,447 (19.0)	
Body mass index (kg/m ²), n (%)			<0.0001
<18.5	1,865 (4.6)	4,300 (5.3)	
18.5-24.9	25,042 (62.4)	47,126 (57.9)	
25.0-29.9	9,258 (23.1)	17,006 (20.9)	
≥ 30.0	3,473 (8.6)	9,195 (11.3)	
Missing	514 (1.3)	3,789 (4.7)	
Ever asthma (from main questionnaire) n (%)	3,549 (8.8)	7,668 (9.4)	0.002

* P values are age-adjusted (excepted for age).

Supplementary table S2 Characteristics of the participants, before imputation, according to the tertiles of the MEDI-LITE diet score, among women (n=26,197) and men (n=8,569) from the NutriNet-Santé study

	Women (n=26,197)			Men (n=8,569)		
	Tertile 1	Tertile 2	Tertile 3	Tertile 1	Tertile 2	Tertile 3
MEDI-LITE, mean (sd)	7.6 (1.4)	10.5 (0.5)	13.2 (1.2)	7.5 (1.5)	10.5 (0.5)	13.2 (1.3)
AHEI-2010, mean (sd)	40.4 (10.1)	46.4 (10.2)	53.0 (11.0)	38.3 (9.8)	45.1 (9.8)	53.2 (10.8)
mPNNS-GS, mean (sd)	7.7 (1.5)	8.4 (1.5)	8.9 (1.4)	7.3 (1.5)	8.2 (1.4)	8.8 (1.4)
Age, years, mean (sd)	49.8 (13.9)	52.9 (13.7)	55.1 (13.0)	56.9 (14.2)	60.2 (13.0)	61.0 (12.7)
Smoking, n (%)						
Never smokers	4,901 (54.9)	4,771 (54.5)	4,566 (53.6)	1,241 (40.6)	1,055 (39.4)	1,238 (43.7)
Ex-smokers	2,765 (31.0)	2,966 (33.9)	3,081 (36.2)	1,387 (45.4)	1,305 (48.7)	1,369 (48.4)
Current smokers	1,267 (14.1)	1,013 (11.6)	866 (10.2)	430 (14.1)	320 (11.9)	224 (7.9)
Missing	0 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pack years among ever smokers, mean (sd)	12.7 (14.5)	10.7 (12.1)	10.5 (11.6)	19.0 (17.7)	16.7 (15.9)	14.5 (14.8)
Educational level, n (%)						
≤ 13	1,782 (20.0)	1,483 (17.0)	1,222 (14.4)	856 (28.0)	681 (25.4)	592 (20.9)
14	1,591 (17.8)	1,395 (15.9)	1,183 (13.9)	426 (13.9)	323 (12.1)	302 (10.7)
15-16	2,922 (32.7)	2,838 (32.4)	2,786 (32.7)	742 (24.3)	630 (23.5)	653 (23.1)
≥ 17	2,575 (28.8)	2,978 (34.0)	3,251 (38.2)	1,021 (33.4)	1,036 (38.7)	1,267 (44.8)

Missing	63 (0.7)	57 (0.7)	71 (0.8)	13 (0.4)	10 (0.4)	17 (0.6)
Leisure-time physical activity, n (%)						
High	2,223 (24.9)	2,549 (29.1)	2,734 (32.1)	1,086 (35.5)	1,097 (40.9)	1,171 (41.4)
Moderate	3,311 (37.1)	3,510 (40.1)	3,559 (41.8)	986 (32.2)	903 (33.7)	1,013 (35.8)
Low	2,158 (24.2)	1,708 (19.5)	1,369 (16.1)	673 (22.0)	430 (16.0)	402 (14.2)
Missing	1,241 (13.9)	984 (11.2)	851 (10.0)	313 (10.2)	250 (9.3)	245 (8.7)
Total daily energy (Kcal), mean (sd)	1,723 (397)	1,770 (371)	1,852 (361)	2,245 (516)	2,257 (488)	2,283 (458)
Body mass index (kg/m ²), mean (sd)	24.3 (5.0)	23.5 (4.3)	22.6 (3.8)	25.7 (4.1)	25.1 (3.7)	24.2 (3.2)
Body mass index (kg/m ²), n (%)						
<18.5	414 (4.6)	476 (5.4)	616 (7.2)	32 (1.1)	22 (0.8)	28 (1.0)
18.5-24.9	5,361 (60.0)	5,747 (65.7)	6,156 (72.3)	1,448 (47.4)	1,427 (53.3)	1,851 (65.4)
25.0-29.9	1,933 (21.6)	1,740 (19.9)	1,260 (14.8)	1,206 (39.4)	994 (37.1)	803 (28.4)
≥ 30.0	1,094 (12.3)	684 (7.8)	401 (4.7)	372 (12.2)	237 (8.8)	146 (5.1)
Missing	131 (1.5)	104 (1.2)	80 (0.9)	0 (0.0)	0 (0.0)	3 (0.1)
Allergic rhinitis, n (%)	3,880 (43.4)	3,686 (42.1)	3,470 (40.8)	885 (28.9)	803 (30.0)	873 (30.8)
Family history of asthma, n (%)	955 (10.7)	866 (9.9)	890 (10.5)	215 (7.0)	215 (8.0)	200 (7.1)
Asthma symptom score ¹						

Mean (sd)	0,48 (0,87)	0,42 (0,84)	0,36 (0,74)	0,45 (0,89)	0,37 (0,79)	0,31 (0,68)
0, n (%)	6,149 (68.8)	6,357 (72.6)	6,370 (74.8)	2,191 (71.7)	2,036 (76.0)	2,217 (78.3)
1, n (%)	1,885 (21.1)	1,639 (18.7)	1,530 (18.0)	575 (18.8)	417 (15.6)	448 (15.8)
2-5, n (%)	899 (10.1)	755 (8.6)	613 (7.2)	292 (9.6)	227 (8.5)	166 (5.9)
Ever asthma ² , n (%)	1,204 (13.5)	976 (11.2)	871 (10.2)	341 (11.2)	254 (9.5)	231 (8.2)
Asthma control test ³ , n (%)						
≥ 20 (well controlled)	683 (83.8)	559 (86.3)	522 (87.0)	198 (85.3)	144 (92.3)	142 (89.9)
16-19 (not well controlled)	92 (11.3)	55 (8.5))	51 (8.5)	22 (9.5)	5 (3.2)	14 (8.9)
≤ 15 (poorly controlled)	40 (4.9)	34 (5.2)	27 (4.5)	12 (5.2)	7 (4.5)	2 (1.3)

1 Number of respiratory symptoms during the past 12 months: 1) breathless while wheezing, 2) woken up with chest tightness, 3) attack of shortness of breath at rest, 4) attack of shortness of breath after exercise, and 5) woken by attack of shortness of breath. Each item is scored from 0 to 1, and the total asthma symptom score ranges from 0 to 5.

2 Defined by at least one positive answer to the question “Have you ever had an asthma attack?” in main questionnaires (baseline, or follow-up), and by a positive answer to “Have you ever had an asthma attack?” or “Have you ever had an attack of shortness of breath at rest with wheezing” in the respiratory survey (2016).

3 Among 2,063 women and 546 men. Based on five questions in the last 4 weeks on: 1) activity limitations: asthma keep from getting as much done at work, school or at home, “some of the time” to “all of the time”; 2) Shortness of breath: “3-6 times/week” to “more than once daily”; 3) Woken up by asthma symptoms at night: “once/week” to “every night”; 4) Use β -agonist inhaler “2 times/week” to “3+ times daily”; and 5) Self-rated asthma control: “Somewhat controlled” to “Not controlled at all”. Each item is scored from 1 to 5, and the total ACT score ranges from 5 to 25.

Supplementary table S3 Characteristics of the participants, before imputation, according to the tertiles of the mPNNS-GS diet score, among women (n=26,197) and men (n=8,569) from the NutriNet-Santé study

	Women (n=26,197)			Men (n=8,569)		
	Tertile 1	Tertile 2	Tertile 3	Tertile 1	Tertile 2	Tertile 3
mPNNS-GS, mean (sd)	6.6 (0.8)	8.3 (0.4)	10.0 (0.8)	6.5 (0.9)	8.3 (0.4)	9.9 (0.7)
AHEI-2010, mean (sd)	39.7 (10.1)	46.3 (10.0)	53.3 (10.4)	38.9 (10.2)	45.8 (10.0)	53.0 (10.9)
MEDI-LITE, mean (sd)	9.1 (2.5)	10.3 (2.5)	11.3 (2.4)	9.2 (2.3)	10.6 (2.6)	11.8 (2.4)
Age, years, mean (sd)	47.8 (13.5)	52.5 (13.3)	57.2 (12.6)	55.8 (14.2)	59.5 (13.0)	63.5 (11.6)
Smoking, n (%)						
Never smokers	4,650 (53.0)	4,514 (54.6)	5,074 (55.5)	1,369 (41.4)	1,076 (40.2)	1,089 (42.1)
Ex-smokers	2,620 (29.8)	2,822 (34.1)	3,370 (36.8)	1,438 (43.5)	1,298 (48.5)	1,325 (51.2)
Current smokers	1,509 (17.2)	933 (11.3)	704 (7.7)	500 (15.1)	300 (11.2)	174 (6.7)
Missing	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pack years among ever smokers, mean (sd)	11.8 (12.7)	11.1 (12.7)	11.1 (13.2)	18.2 (17.7)	16.5 (15.8)	15.4 (15.0)
Educational level, n (%)						
≤ 13	1,395 (15.9)	1,394 (16.9)	1,698 (18.6)	851 (25.7)	643 (24.1)	635 (24.5)
14	1,523 (17.4)	1,232 (14.9)	1,414 (15.5)	451 (13.6)	314 (11.7)	286 (11.1)
15-16	2,915 (33.2)	2,683 (32.5)	2,948 (32.2)	835 (25.3)	631 (23.6)	559 (21.6)

≥ 17	2,894 (33.0)	2,894 (35.0)	3,016 (33.0)	1,158 (35.0)	1,081 (40.4)	1,085 (41.9)
Missing	53 (0.6)	66 (0.8)	72 (0.8)	12 (0.4)	5 (0.2)	23 (0.9)
Leisure-time physical activity, n (%)						
High	2,092 (23.8)	2,278 (27.6)	3,136 (34.3)	1,181 (35.7)	1,027 (38.4)	1,146 (44.3)
Moderate	3,422 (39.0)	3,385 (40.9)	3,573 (39.1)	1,088 (32.9)	945 (35.3)	869 (33.6)
Low	2,203 (25.1)	1,658 (20.1)	1,374 (15.0)	699 (21.1)	459 (17.2)	347 (13.4)
Missing	1,063 (12.1)	948 (11.5)	1,065 (11.6)	339 (10.3)	243 (9.1)	226 (8.7)
Total daily energy (Kcal), mean (sd)	1,850 (408)	1,770 (375)	1,723 (346)	2,367 (522)	2,238 (862)	2,150 (840)
Body mass index (kg/m ²), mean (sd)	23.4 (4.7)	23.6 (4.4)	23.5 (4.3)	25.2 (4.0)	25.1 (3.7)	24.7 (3.3)
Body mass index (kg/m ²), n (%)						
<18.5	570 (6.5)	421 (5.1)	515 (5.6)	38 (1.2)	23 (0.9)	21 (0.8)
18.5-24.9	5,809 (66.2)	5,462 (66.1)	5,993 (65.5)	1,744 (52.7)	1,460 (54.6)	1,522 (58.8)
25.0-29.9	1,489 (17.0)	1,595 (19.3)	1,849 (20.2)	1,193 (36.1)	945 (35.3)	865 (33.4)
≥ 30.0	783 (8.9)	674 (8.2)	722 (7.9)	331 (10.0)	245 (9.2)	179 (6.9)
Missing	129 (1.5)	117 (1.4)	69 (0.8)	1 (0.0)	1 (0.0)	1 (0.0)
Allergic rhinitis, n (%)	3,886 (44.3)	3,478 (42.1)	3,672 (40.1)	1,004 (30.4)	845 (31.6)	712 (27.5)
Family history of asthma, n (%)	899 (10.2)	870 (10.5)	942 (10.3)	239 (7.2)	208 (7.8)	183 (7.1)
Asthma symptom score ¹						
Mean (sd)	0.45 (0.85)	0.42 (0.80)	0.39 (0.81)	0.43 (0.87)	0.38 (0.78)	0.30 (0.70)
0, n (%)	6,136 (69.9)	5,933 (71.8)	6,807 (74.4)	2,410 (72.9)	1,987 (74.3)	2,047 (79.1)
1, n (%)	1,816 (20.7)	1,627 (19.7)	1,611 (17.6)	576 (17.4)	485 (18.1)	379 (14.6)
2-5, n (%)	828 (9.4)	709 (8.6)	730 (8.0)	321 (9.7)	202 (7.6)	162 (6.3)

Ever asthma ² , n (%)	1,114 (12.7)	971 (11.7)	966 (10.6)	358 (10.8)	279 (10.4)	189 (7.3)
Asthma control test ³ , n (%)						
≥ 20 (well controlled)	649 (87.2)	574 (85.8)	541 (83.2)	194 (84.3)	176 (91.2)	114 (92.7)
16-19 (not well controlled)	68 (9.2)	67 (10.0)	63 (9.7)	20 (8.7)	14 (7.2)	7 (5.7)
≤ 15 (poorly controlled)	27 (3.6)	28 (4.2)	46 (7.1)	16 (7.0)	3 (1.6)	2 (1.6)

1 Number of respiratory symptoms during the past 12 months: 1) breathless while wheezing, 2) woken up with chest tightness, 3) attack of shortness of breath at rest, 4) attack of shortness of breath after exercise, and 5) woken by attack of shortness of breath. Each item is scored from 0 to 1, and the total asthma symptom score ranges from 0 to 5.

2 Defined by at least one positive answer to the question “Have you ever had an asthma attack?” in main questionnaires (baseline, or follow-up), and by a positive answer to “Have you ever had an asthma attack?” or “Have you ever had an attack of shortness of breath at rest with wheezing” in the respiratory survey (2016).

3 Among 2,063 women and 546 men. Based on five questions in the last 4 weeks on: 1) activity limitations: asthma keep from getting as much done at work, school or at home, “some of the time” to “all of the time”; 2) Shortness of breath: “3-6 times/week” to “more than once daily”; 3) Woken up by asthma symptoms at night: “once/week” to “every night”; 4) Use β -agonist inhaler “2 times/week” to “3+ times daily”; and 5) Self-rated asthma control: “Somewhat controlled” to “Not controlled at all”. Each item is scored from 1 to 5, and the total ACT score ranges from 5 to 25.

Supplementary table S4 Associations between tertiles of dietary scores and asthma symptom score (continuous variable) among women and men from the NutriNet-Santé study without ever asthma (among those who never reported asthma from baseline till the respiratory survey) (n=31,663)

	Women (n=23,752)				Men (n=7,911)			
	Tertile 1	Tertile 2	Tertile 3	P for trend	Tertile 1	Tertile 2	Tertile 3	P for trend
AHEI-2010								
n	7,551	7,926	8,275		2,822	2,648	2,441	
Mean (sd)	33.9 (5.5)	45.9 (2.9)	59.2 (6.7)		33.3 (5.9)	45.7 (2.9)	59.2 (7.0)	
OR (95% CI) ¹	1.00 (ref)	0.81 (0.76-0.87)	0.76 (0.72-0.82)	<0.0001	1.00 (ref)	0.82 (0.73-0.92)	0.62 (0.55-0.70)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.83 (0.78-0.89)	0.81 (0.76-0.86)	<0.0001	1.00 (ref)	0.87 (0.78-0.97)	0.69 (0.61-0.78)	<0.0001
MEDI-LITE								
n	8,935	6,724	8,093		2,892	2,142	2,877	
Mean (sd)	7.6 (1.4)	10.5 (0.5)	13.2 (1.2)		7.5 (1.4)	10.5 (0.5)	13.3 (1.3)	
OR (95% CI) ¹	1.00 (ref)	0.92 (0.83-1.03)	0.81 (0.72-0.92)	<0.0001	1.00 (ref)	0.81 (0.72-0.91)	0.69 (0.62-0.77)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.85 (0.80-0.90)	0.80 (0.75-0.85)	<0.0001	1.00 (ref)	0.86 (0.76-0.96)	0.75 (0.67-0.84)	<0.0001
mPNNS-GS								
n	7,885	7,497	8,370		3,020	2,452	2,439	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	10.0 (0.8)		6.5 (0.9)	8.3 (0.4)	9.9 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.91 (0.85-0.97)	0.82 (0.76-0.87)	<0.0001	1.00 (ref)	0.87 (0.78-0.98)	0.70 (0.62-0.79)	<0.0001

OR (95% CI) ²	1.00 (ref)	0.95 (0.89. 1.01)	0.87 (0.82. 0.93)	<0.0001	1.00 (ref)	0.91 (0.82. 1.02)	0.78 (0.69. 0.88)	<0.001
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1 Models were adjusted for age.

2 Models were further adjusted for smoking, pack-years (among ever smokers), educational level, leisure-time physical activity, total daily energy, allergic rhinitis, and family history of asthma.

Supplementary table S5 Associations between tertiles of dietary scores and asthma symptom score (continuous variable) among women and men from the NutriNet-Santé study, stratified according to smoking

	Women (n=26,197)				Men (n=8,569)			
	Tertile 1	Tertile 2	Tertile 3	P for trend	Tertile 1	Tertile 2	Tertile 3	P for trend
Never smokers								
AHEI-2010								
n	4,829	4,746	4,664		1,250	1,163	1,121	
Mean (sd)	33.7 (5.5)	45.8 (2.9)	59.0 (6.6)		33.1 (5.9)	45.7 (3.0)	59.7 (7.2)	
OR (95% CI) ¹	1.00 (ref)	0.87 (0.80-0.95)	0.78 (0.71-0.85)	<0.0001	1.00 (ref)	0.89 (0.74-1.08)	0.68 (0.55-0.83)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.92 (0.85-1.00)	0.87 (0.80-0.95)	<0.0001	1.00 (ref)	0.89 (0.74-1.08)	0.72 (0.59-0.88)	<0.0001
MEDI-LITE								
n	4,901	4,772	4,566		1,241	1,055	1,238	
Mean (sd)	6.0 (1.1)	8.5 (0.5)	10.9 (1.0)		5.8 (1.2)	8.5 (0.5)	11.1 (1.2)	
OR (95% CI) ¹	1.00 (ref)	0.86 (0.79-0.93)	0.76 (0.70-0.82)	<0.0001	1.00 (ref)	0.79 (0.65-0.96)	0.68 (0.56-0.82)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.91 (0.84-0.98)	0.86 (0.79-0.94)	<0.0001	1.00 (ref)	0.83 (0.68-1.00)	0.74 (0.61-0.90)	<0.0001
mPNNs-GS								
n	4,651	4,514	5,074		1,369	1,076	1,089	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	10.0 (0.8)		6.5 (0.9)	8.3 (0.4)	9.9 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.92 (0.85-1.00)	0.84 (0.77-0.91)	<0.0001	1.00 (ref)	0.89 (0.74-1.08)	0.76 (0.62-0.93)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.93 (0.86-1.01)	0.86 (0.79-0.93)	<0.0001	1.00 (ref)	0.90 (0.75-1.09)	0.76 (0.62-0.93)	<0.0001
Former smokers								
AHEI-2010								

n	2,336	2,956	3,520		1,353	1,398	1,310	
Mean (sd)	34.5 (5.3)	46.1 (2.9)	59.5 (6.7)		33.7 (5.5)	45.8 (2.9)	59.0 (6.8)	
OR (95% CI) ¹	1.00 (ref)	0.84 (0.75-0.93)	0.78 (0.70-0.87)	<0.0001	1.00 (ref)	0.80 (0.69,0.93)	0.66 (0.56,0.77)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.88 (0.78-0.99)	0.84 (0.76-0.93)	<0.0001	1.00 (ref)	0.81 (0.70-0.94)	0.69 (0.58-0.83)	<0.0001
MEDI-LITE								
n	2,765	2,966	3,081		1,387	1,305	1,369	
Mean (sd)	6.0 (1.1)	8.5 (0.5)	11.0 (1.0)		5.9 (1.2)	8.5 (0.5)	11.1 (1.1)	
OR (95% CI) ¹	1.00 (ref)	0.91(0.83-1.01)	0.75(0.68-0.83)	<0.0001	1.00 (ref)	0.85(0.73-0.99)	0.72(0.61-0.84)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.96 (0.87-1.05)	0.83 (0.75-0.92)	0.01	1.00 (ref)	0.89 (0.77- 1.04)	0.82 (0.70-0.96)	0.0003
mPNNS-GS								
n	2,620	2,822	3,370		1,438	1,298	1,325	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	10.0 (0.8)		6.6 (0.8)	8.3 (0.4)	9.9 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.91(0.83-1.01)	0.75(0.68-0.83)	0.22	1.00 (ref)	0.85(0.73-0.99)	0.72(0.61-0.84)	<0.0001
OR (95% CI) ²	1.00 (ref)	1.02 (0.92-1.13)	0.95 (0.86-1.05)	0.28	1.00 (ref)	0.94 (0.81-1.09)	0.77 (0.66-0.90)	0.001
Current smokers								
AHEI-2010								
n	1,322	1,037	787		499	288	187	
Mean (sd)	33.1 (5.9)	45.8 (2.9)	58.5 (6.3)		32.4 (6.3)	45.3 (2.9)	57.6 (5.9)	
OR (95% CI) ¹	1.00 (ref)	0.76(0.66-0.87)	0.66(0.57-0.78)	<0.0001	1.00 (ref)	0.87(0.68-1.10)	0.72(0.54-0.95)	0.02
OR (95% CI) ²	1.00 (ref)	0.93 (0.82-1.02)	0.73 (0.62-0.85)	<0.0001	1.00 (ref)	0.90 (0.71-1.13)	0.75 (0.56-0.99)	0.04
MEDI-LITE								
n	1,267	1,013	866		430	320	224	

Mean (sd)	5.9 (1.2)	8.5 (0.5)	10.9 (1.0)		5.7 (1.3)	8.5 (0.5)	10.9 (1.1)	
OR (95% CI) ¹	1.00 (ref)	0.88(0.76-1.01)	0.79(0.68-0.92)	0.002	1.00 (ref)	0.85(0.67-1.07)	0.73(0.55-0.95)	0.02
OR (95% CI) ²	1.00 (ref)	0.95 (0.83-1.09)	0.87 (0.75-1.02)	0.03	1.00 (ref)	0.89 (0.70-1.12)	0.77 (0.59-1.01)	0.04
mPNNS-GS								
n	1,509	933	704		500	300	174	
Mean (sd)	6.4 (0.9)	8.3 (0.4)	9.8 (0.7)		6.4 (0.9)	8.3 (0.4)	9.8 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.78(0.68-0.90)	0.83(0.71-0.97)	0.004	1.00 (ref)	0.70(0.55-0.89)	0.72(0.54-0.97)	0.01
OR (95% CI) ²	1.00 (ref)	0.80 (0.70-0.93)	0.85 (0.72-0.99)	0.02	1.00 (ref)	0.72 (0.57-0.92)	0.74 (0.55-0.99)	0.01

¹ Models were adjusted for age.

² Models were further adjusted for pack-years (among ever smokers), educational level, leisure-time physical activity, total daily energy, allergic rhinitis, and family history of asthma.

Supplementary table S6 Associations between tertiles of dietary scores and asthma symptom score (continuous variable) among women and men from the NutriNet-Santé study, stratified according to body mass index.

Associations between tertiles of dietary scores and asthma symptom score (continuous variable) among the 3rd Cohort of the 3C-Santé study, stratified according to body mass index.

	Women (n=26,197)				Men (n=8,569)			
	Tertile 1	Tertile 2	Tertile 3	P for trend	Tertile 1	Tertile 2	Tertile 3	P for trend
Body mass index <25.0 kg/m ²								
AHEI-2010								
n	6,028	6,213	6,739		1,610	1,574	1,625	
Mean (sd)	33.8 (5.5)	45.9 (2.9)	59.5 (6.9)		33.4 (5.7)	45.7 (2.9)	60.1 (7.4)	
OR (95% CI) ¹	1.00 (ref)	0.85(0.79-0.92)	0.79(0.73-0.85)	<0.0001	1.00 (ref)	0.86(0.73-1.01)	0.65(0.54-0.77)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.87 (0.81-0.94)	0.83 (0.77-0.90)	<0.0001	1.00 (ref)	0.87 (0.74-1.02)	0.69 (0.58-0.82)	<0.0001
MEDI-LITE								
n	5,866	6,292	6,822		1,480	1,449	1,880	
Mean (sd)	6.0 (1.1)	8.5 (0.5)	11.0 (1.0)		5.9 (1.2)	8.5 (0.5)	11.2 (1.2)	
OR (95% CI) ¹	1.00 (ref)	0.93(0.87-1.00)	0.82(0.76-0.88)	<0.0001	1.00 (ref)	0.88(0.74-1.04)	0.73(0.62-0.87)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.94 (0.88-1.01)	0.83 (0.77-0.90)	<0.0001	1.00 (ref)	0.88 (0.75-1.04)	0.78 (0.66-0.92)	<0.0001
mPNNS-GS								
n	6,464	5,961	6,555		1,783	1,483	1,543	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	10.0 (0.8)		6.5 (0.9)	8.3 (0.4)	9.9 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.91(0.84-0.98)	0.85(0.78-0.91)	<0.0001	1.00 (ref)	0.84(0.72-0.99)	0.65(0.55-0.77)	<0.0001
OR (95% CI) ²	1.00 (ref)	0.94 (0.87-1.01)	0.89 (0.82-0.96)	<0.0001	1.00 (ref)	0.84 (0.72-0.99)	0.68 (0.58-0.81)	<0.0001
25 ≤ Body mass index < 30								
AHEI-2010								

n	1,592	1,779	1,661		1,178	1,016	811	
Mean (sd)	34.2 (5.3)	46.0 (2.9)	58.1 (5.6)		33.3 (5.8)	45.8 (3.0)	58.0 (5.8)	
OR (95% CI) ¹	1.00 (ref)	0.89(0.79-1.01)	0.86(0.76-0.98)	0.02	1.00 (ref)	0.84(0.71-1.00)	0.70(0.58-0.84)	0.0001
OR (95% CI) ²	1.00 (ref)	0.89 (0.79- 1.00)	0.86 (0.76- 0.97)	0.01	1.00 (ref)	0.86 (0.73-1.01)	0.69 (0.58-0.83)	<0.0001
MEDI-LITE								
n	1,531	1,631	1,870		1,206	994	805	
Mean (sd)	5.9 (1.2)	8.5 (0.5)	10.8 (1.0)		5.8 (1.2)	8.5 (0.5)	10.9 (1.0)	
OR (95% CI) ¹	1.00 (ref)	0.86(0.77-0.96)	0.86(0.76-0.98)	0.01	1.00 (ref)	0.83(0.70-0.98)	0.77(0.64-0.92)	0.003
OR (95% CI) ²	1.00 (ref)	0.86 (0.77-0.96)	0.86 (0.76-0.98)	0.01	1.00 (ref)	0.81 (0.69-0.96)	0.78 (0.65-0.93)	0.002
mPNNS-GS								
n	1,969	1,775	1,288		1,193	946	866	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	9.9 (0.7)		6.5 (0.9)	8.3 (0.4)	9.8 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.92(0.82-1.04)	0.89(0.79-1.01)	0.08	1.00 (ref)	0.92(0.77-1.09)	0.81(0.67-0.97)	0.0001
OR (95% CI) ²	1.00 (ref)	0.90 (0.80-1.01)	0.87 (0.77-0.98)	0.02	1.00 (ref)	0.92 (0.78-1.08)	0.82 (0.68-0.98)	0.03
Body mass index ≥ 30 kg/m ²								
AHEI-2010								
n	867	747	571		314	259	182	
Mean (sd)	33.5 (5.7)	45.7 (2.9)	57.7 (5.6)		32.5 (6.5)	45.7 (3.0)	56.8 (5.1)	
OR (95% CI) ¹	1.00 (ref)	0.85(0.74-0.98)	0.87(0.74-1.02)	0.05	1.00 (ref)	0.74(0.58-0.94)	0.74(0.57-0.97)	0.01
OR (95% CI) ²	1.00 (ref)	0.86 (0.74-0.99)	0.88 (0.75-1.02)	0.05	1.00 (ref)	0.73 (0.58-0.93)	0.76 (0.59-1.00)	0.01
MEDI-LITE								
n	1,098	684	403		372	237	146	

Mean (sd)	5.8 (1.2)	8.5 (0.5)	10.7 (0.9)		5.7 (1.2)	8.5 (0.5)	10.8 (1.0)	
OR (95% CI) ¹	1.00 (ref)	1.00(0.87-1.14)	0.97(0.82-1.15)	0.78	1.00 (ref)	0.89(0.70-1.13)	0.78(0.58-1.04)	0.08
OR (95% CI) ²	1.00 (ref)	0.96 (0.84-1.10)	0.96 (0.81-1.14)	0.50	1.00 (ref)	0.88 (0.70-1.11)	0.81 (0.61-1.07)	0.10
mPNNS-GS								
n	785	677	723		331	245	179	
Mean (sd)	6.6 (0.8)	8.3 (0.4)	9.9 (0.7)		6.5 (0.9)	8.3 (0.4)	9.8 (0.7)	
OR (95% CI) ¹	1.00 (ref)	0.99(0.85-1.15)	0.93(0.80-1.09)	0.37	1.00 (ref)	0.90(0.71-1.14)	0.78(0.59-1.04)	0.09
OR (95% CI) ²	1.00 (ref)	1.00 (0.86- 1.16)	0.94 (0.80- 1.09)	0.34	1.00 (ref)	0.92 (0.73- 1.16)	0.82 (0.62- 1.08)	0.17

¹ Models were adjusted for age.

² Models were further adjusted for smoking, pack-years (among ever smokers), educational level, leisure-time physical activity, total daily energy, allergic rhinitis, and family history of asthma.

Supplementary table S7

Characteristics of the participants according to asthma control, among 2,063 women and 546 men with asthma

	Women (n=2,063)		Men (n=546)	
	ACT > 19	ACT ≤19	ACT >19	ACT ≤19
n (%)	1,764 (85.5)	299 (14.5)	484 (88.6)	62 (11.3)
AHEI-2010, mean (sd)	45.2 (11.4)	43.8 (11.5)	44.2 (11.9)	40.9 (11.0)
MEDI-LITE, mean (sd)	10.0 (2.6)	9.7 (2.1)	10.1 (2.8)	9.3 (3.0)
mPNNs-GS, mean (sd)	8.1 (1.5)	8.3 (1.5)	7.9 (1.5)	7.5 (1.3)
Age, years, mean (sd)	48.8 (13.4)	51.9 (13.2)	54.5 (13.4)	57.7 (12.3)
Smoking, n (%)				
Never smokers	953 (54.0)	147 (49.2)	222 (45.9)	19 (30.7)
Former smokers	584 (33.1)	110 (36.8)	190 (39.2)	34 (54.8)
Current smokers	227 (12.9)	42 (14.0)	72 (14.9)	9 (14.5)
Missing	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pack years among ever smokers, mean (sd)	9.7 (10.3)	15.3 (17.4)	14.3 (14.3)	18.6 (18.6)
Educational level, n (%)				

≤ 13	211 (12.0)	55 (18.4)	86 (17.8)	15 (24.2)
14	259 (14.6)	40 (13.4)	54 (11.2)	10 (16.2)
15-16	600 (34.0)	106 (35.5)	112 (23.1)	11 (17.7)
≥ 17	679 (38.5)	96 (32.0)	231 (47.7)	26 (41.9)
Missing	15 (0.9)	2 (0.7)	1 (0.2)	0 (0.0)
Leisure-time physical activity, n (%)				
High	460 (26.1)	92 (30.8)	160 (33.1)	28 (45.2)
Moderate	772 (43.8)	106 (35.5)	186 (38.4)	19 (30.7)
Low	329 (18.7)	58 (19.4)	95 (19.6)	8 (12.9)
Missing	203 (11.4)	43 (14.3)	43 (8.9)	7 (11.3)
Total daily energy (Kcal), mean (sd)	1,792 (401)	1,734 (412)	2,289 (506)	2,248 (531)
Body mass index (kg/m ²), mean (sd)	24.0 (5.0)	26.0 (6.2)	25.0 (3.7)	25.3 (3.6)
Body mass index (kg/m ²), n (%)				
<18.5	90 (5.1)	14 (4.7)	4 (0.8)	1 (1.6)
18.5-24.9	1,103 (62.5)	135 (45.2)	272 (56.2)	32 (51.6)
25.0-29.9	370 (21.0)	72 (24.1)	164 (33.9)	21 (33.9)
≥ 30.0	182 (10.3)	72 (24.1)	44 (9.1)	8 (12.9)
Missing	19 (1.1)	6 (2.0)	0 (0.0)	0 (0.0)
Allergic rhinitis, n (%)	1,355 (76.8)	235 (78.6)	314 (64.9)	45 (72.6)

Family history of asthma, n (%)	404 (22.9)	80 (26.8)	90 (18.6)	19 (30.7)
Asthma Control Test score components, n (%) ¹				
Activity limitations	64 (3.6)	192 (64.2)	9 (1.9)	38 (61.3)
Shortness of breath	53 (3.0)	153 (51.2)	7 (1.5)	24 (38.7)
Woken up by asthma symptoms at night	10 (0.6)	98 (32.8)	2 (0.4)	18 (29.0)
Use of β -agonist inhaler	87 (4.9)	173 (57.9)	36 (7.4)	44 (71.0)
Poor self-rated asthma control	23 (1.3)	120 (40.1)	10 (2.1)	26 (41.9)

1 In the last 4 weeks - activity limitations: asthma keep from getting as much done at work, school or at home, “some of the time” to “all of the time”; Shortness of breath: “3-6 times/week” to “more than once daily”; Woken up by asthma symptoms at night: “once/week” to “every night”; Use β -agonist inhaler “2 times/week” to “3+ times daily”; Self-rated asthma control: “Somewhat controlled” to “Not controlled at all”